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Report of Conference of Agricultural Officials, Held At the University Of 1
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REPORT
of
AGRICULTURAL CONFERENCE

-HELD AT EDMONTON-

• DECEMBER 28th TO 30th —— 1936 •

STAFFS OF

• THE ALBERTA DEPARTMENT OF AGRICULTURE •
• THE FACULTY OF AGRICULTURE — UNIVERSITY OF ALBERTA •
• THE FEDERAL DEPARTMENT OF AGRICULTURE (IN ALBERTA) •

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R E P O R T

Of Conference of Agricultural Officials

Held at the University of Alberta, Edmonton,
December 28th to 30th, 1936

The Alberta Department of Agriculture
The Faculty of Agriculture of the University
The Dominion Department of Agriculture, (In Alberta)

The primary purpose of the Conference was to bring together those engaged in technical agricultural work within the Province, for discussion of agricultural problems common to all. It was hoped through the information presented by the speakers and emanating from the discussion, that a more or less common understanding and viewpoint might be reached, especially with respect to methods of extension and recommended agricultural practices, with the objective that greater uniformity of thought and action might govern the efforts of all agricultural agencies in their contacts with the farming public.

In order that conclusions arrived at through the Conference might be properly preserved, an editorial committee and several sub-committees were appointed to gather together material for record, the reports of these committees to be published in one volume for distribution to the delegates and other members of the agricultural staffs within the Province. In addition to material growing out of the Conference, the committees were at liberty to include a limited amount of other information which, in their opinion, should be placed before our agricultural workers at this time. It was the desire of the Conference that these committees shall remain as standing committees until such time as another conference may be called.

The Committees appointed are given below and the reports of the sub-committees follow in the order that they are listed:

Editorial Committee

H. A. Craig, (Chairman); Dr. E. A. Howes; Dr. W. H. Fairfield; S. H. Gandier.

Sub-Committees

Forage Crops and Weeds:

Dr. J. R. Fryer, (Chairman); O. S. Longman; G. M. Stewart; W. H. Fairfield; W. N. Pidruchney; W. D. Albright.

Soil and Fertilizers:

Dr. F. A. Wyatt, (Chairman); Jas. Murray; W. J. Elliott; Dr. J. D. Newton; A. E. Palmer.

Cereal Variety Zonation:

Dr. K. W. Neatby, (Chairman); C. T. Tapp; G. E. DeLong; B. J. Whitbread.

Crop Pests and Diseases:

O. S. Longman, (Chairman); Dr. A. W. Henry; H. L. Seamans; Prof. E. H. Strickland; Dr. G. B. Sanford.

Cattle Policy:

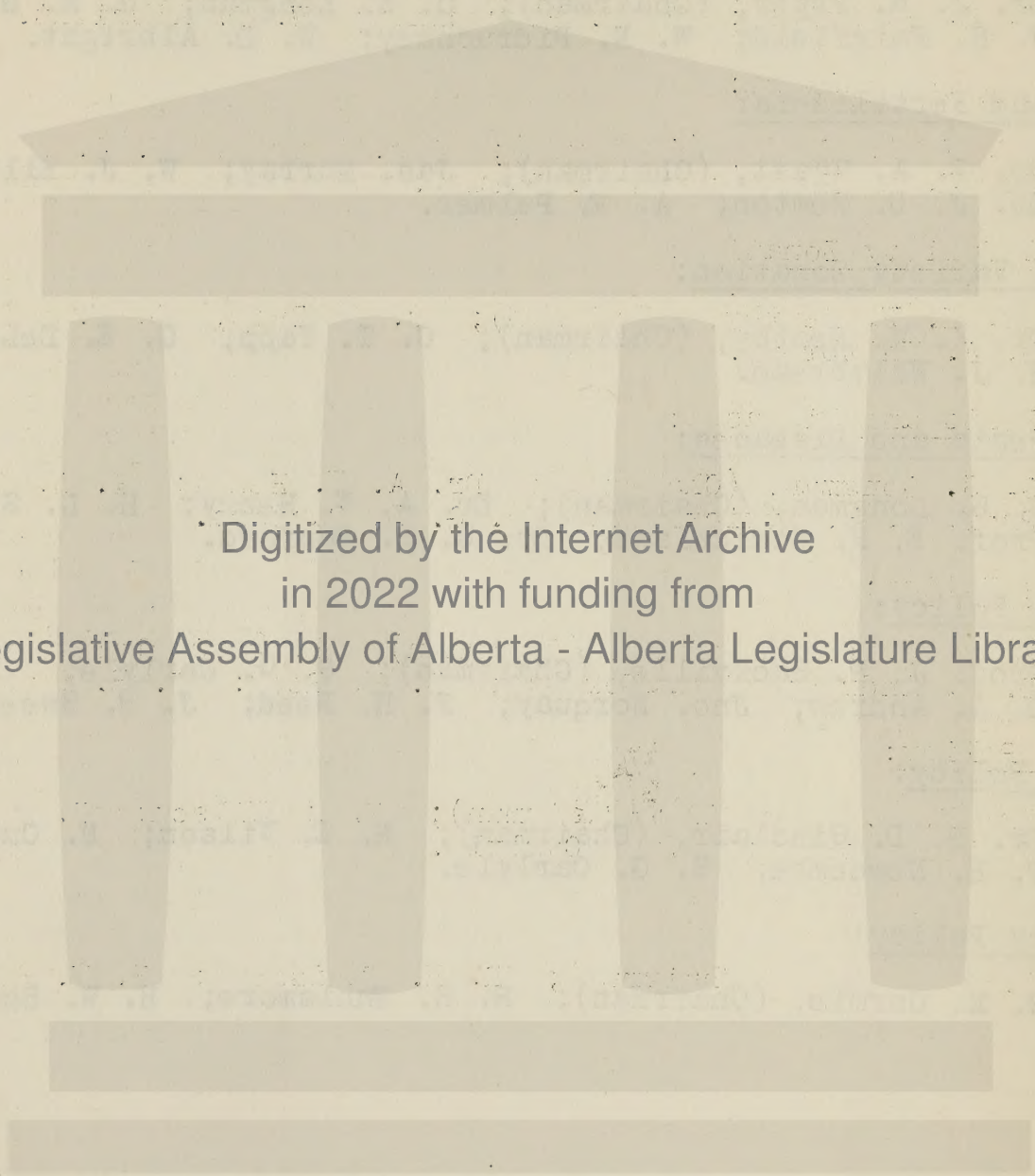
Prof. J. P. Sackville, (Chairman); S. G. Carlyle; D. A. Andrew; Jno. Norquay; F. H. Reed; J. R. Sweeney.

Swine Policy:

Dr. R. D. Sinclair, (Chairman); H. E. Wilson; N. Curtis; F. H. Newcombe; S. G. Carlyle.

Poultry Policy:

G. M. Cormie, (Chairman); R. H. Ennismore; H. W. Scott.



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REPORT OF COMMITTEE ON FORAGE CROPS AND WEEDS

In this report an effort has been made to integrate the various remarks made in the discussions that took place on forage crops at the recent conference, but only those contributory ideas have been included which appeared to possess the most definitely informative value for the farmer. The material has been organized under various topics and sub-topics, and where practicable specific reference has been made to the three major soil zones.

1. KINDS OF FORAGE CROPS RECOMMENDED. On brown soils (Zones 1 and 2). Rye, wheat, oats, barley, corn and sunflowers are the annual plants used, wheat and oats being most important. For high ground crested wheat grass is the most successful perennial; brome grass is adapted except where conditions are not too dry. For moister depressions, these grasses, alfalfa, and sweet clover are suitable. For irrigated land, alfalfa, sweet clover, timothy and alsike are most commonly grown. In the northern parts of these zones soils with a sandy surface underlaid with clay soil are regarded as better suited for grasses, alfalfa and clovers than soils with a heavy clay surface, the difference being related to the ease of penetration by precipitation in the former and the quick heavy run-off from the latter. On black soils (Zone 3). Oats, rye, rape, corn and sunflowers are suitable annual crops; brome grass, timothy, slender wheat grass, Kentucky blue grass, creeping red fescue, alfalfa, sweet, Altaswede and alsike clovers are recommended. For sloughs subject to spring flooding, a mixture of timothy, red top and alsike clover or Reed Canary Grass are best. On gray soils (Zone 4). Same as for the black soils.

2. GETTING SATISFACTORY STANDS. On brown soils (Zones 1 and 2). Annual crops are seeded preferably on fallow at the usual time in spring. Fall rye is best seeded September 1st to 15th. Crested wheat grass is more certain when seeded in the fall, or early spring, being drilled in stubble without pre-cultivation. In case of drifting land seed to spring rye to provide protecting stubble before seeding to crested wheat. Where drifting is severe, cover with straw, manure or weeds to protect the seeded spring rye. Alfalfa is preferably seeded in early spring on non-cultivated stubble, when the frost is out of the surface soil only. Crested wheat and creeping red fescue well established are not killed out by weeds. Breaking the hard surface of very heavy soils may be advisable before seeding to these grasses. In zone 2 spring seeding is favored. Where the surface of clay soils may bake, breaking the surface crust may be necessary before seeding. On black soils (Zone 3). Oats for green feed may be seeded up to June 20th. Grasses and clovers are best seeded without a nurse crop on stubble land which has been spring cultivated shallowly until June 15th. Land containing perennial weeds should be ploughed. Seeding should be done in the 2nd or 3rd week in June. The soil must be very firm and the grasses and clover seeds sown not deeper than half an inch. Where land is not likely to drift or bake, packing before or after seeding or both is beneficial. If a nurse crop must be used the rate of seeding it should be reduced to one-third or one-half; oats for green feed is to be preferred as a nurse crop. On gray soils (Zone 4). The same as given above for black soils applies, except that in districts where adequate summer rainfall is certain, the nurse crop may be used more freely.

3. INOCULATION. On all soils not previously inoculated by a successful legume crop of suitable kind grown in recent years, suitable bacteria inoculum should be applied either to the seed to be sown or to the field. Cultures are obtainable from the Provincial School of Agriculture, Vermilion, Alberta, the Dominion Bacteriologist, Central Experimental Farm, Ottawa, for amounts up to 60 pounds, or the seed firms.

4. MIXTURES. Mixtures of kinds, especially grasses with legumes, are preferable to the kinds grown singly from practically every standpoint except where seed production is desired or where the hay is to be marketed on grade. Yields are higher, flush period of pasture is spread and feed is more nutritious. Soil fiber is maintained by grasses, while soil fertility is improved by legumes; hay crops are more readily cured if grass is present; grasses with legumes in pastures tend to reduce danger of bloating in cattle and sheep. On brown soils (Zones 1 and 2). Crested wheat and alfalfa are suggested for locations sufficiently moist for alfalfa. For short term meadows or pastures, brome grass and sweet clover may be used. Seeding sweet clover directly on renovated brome stands is suggested. On black soils (Zone 3). For hay on high land use 4 lbs. timothy and 6 lbs. Altaswede red clover per acre, or 7 lbs. brome and 6 lbs. alfalfa per acre, or 8 lbs. slender wheat grass and 6 lbs. alfalfa per acre are recommended. For purposes of hay and pasture combined the following is suggested: 3 lbs. brome, 2 lbs. timothy, 2 lbs. Kentucky blue grass, 3 lbs. Altaswede clover and 3 lbs. alfalfa. On wet land and slough margins use 2 lbs. red top, 2 lbs. timothy and 3 lbs. alsike per acre. One authority advocates the use of only one grass and one legume in mixture, always using the same kinds, on any particular farm, the idea being that, should the farmer wish to grow seed in any year, he would not have a difficult mixture of seed to deal with, nor would he be handicapped by the volunteering of undesirable crop plants in his seed crop. If a farmer anticipated growing grass or clover seed crops he should certainly be cautious as to what kinds of forage crop seed he introduced into his land. For summer and fall pasture a mixture of 2 bus. oats and 1 bus. fall rye seeded in the spring is extremely useful. An improved green feed is grown if 12 lbs. sweet clover seed and $\frac{1}{2}$ bus. oats are sown between May 20 and 31 on clean stubble which has been shallowly cultivated at intervals during the spring. The sweet clover remains to give a crop the second year.

5. CARE OF PERENNIAL FORAGE CROP STANDS. In the season of seeding, where nurse crops have not been used, weeds should be mowed high before they have made too much growth, and left lying on the field. Pasturing should be avoided. In a very favorable season a cutting of hay may be taken, but cutting should not be done between August 15 and September 20. Perennial stands should be broken as soon as they yield unsatisfactorily or become weedy. On the black and gray soils, it would seem that three or four crops from a stand would ordinarily be all that should be taken before the stand is ploughed up and some other kind of crop grown or treatment given.

6. PASTURES. Perennial pastures on the black and gray soils are usually short and dry in August and September. This condition is greatly alleviated by the inclusion of alfalfa in the pasture mixtures Brome and crested wheat grasses provide early pasture and crested wheat furnishes pasture later in the fall than any other grass or

legume because it is more frost resistant, although it is rather unpalatable. Pasture mixtures should include constituents which yield a maximum length of pasture period through the season.

7. HAY HARVESTING AND CURING. The stage of maturity is usually too far advanced when hay is generally cut. If cutting were done earlier the palatability would be improved. The protein content and hence the feeding value would be higher and the quality better. The fiber and yield would, however, be somewhat less. Experiments indicate that the protein content is very appreciably higher in timothy hay when cutting is done at head emergence. Wet weather in July renders the curing of hay precarious in central and northern Alberta. Growing late maturing varieties is suggested. Also the use of the stack silo and the trench silo is suggested, the freshly cut material being ensiled without chopping, but very thoroughly packed. In north European countries and in other damp regions where hay curing is difficult, artificial drying machines are being used and experimented with, but the cost of the drying plants is prohibitive to the ordinary individual farmer. Interested farmers may enquire from the Dominion Experimental Farms or the Field Crops Department, University of Alberta, for further information re ensiling hay.

8. SEED PRODUCTION. Areas most suitable for forage seed growing. Opinion seems to favor the moister parts of the Province for seed growing, except perhaps for alfalfa seed, of which the quality and yield are likely to be good on the brown and gray soils, but very uncertain on the black soils area. Altaswede, Siberian red and alsike clovers produce seed particularly well on the black and gray soils. There are believed to be several localities which are especially well adapted for growing certain kinds of forage seeds. These should and no doubt will be further developed.

Special Growers. From several standpoints it would seem advisable to encourage certain farmers or groups of farmers who have special aptitude for seed growing and who live in favourable locations, to grow forage crop seeds rather extensively, rather than to encourage many farmers indiscriminately to grow these seeds. The general farmer is likely to meet with disappointment and to throw on the market seed which is indifferent or poor in quality, and which is difficult to clean. Special seed growers would do well to develop individually systems of farming suited to their particular conditions, which would include certain forage seed crops and in which no other farming project would conflict with, jeopardize or render unduly expensive the production of the forage seed crops year after year. Threshing and cleaning. Thus far the grain thresher with certain modifications and adjustments has been paactically exclusively used for threshing grass and clover seeds. Much better work could be done with alfalfa and clovers by a clover huller, and with less loss of seed. It would seem that special growers might singly or in groups produce seed on a scale large enough to justify the purchase of hullers. Cleaning forage seeds is difficult and requires special sieves and suitable air blast devices. Growers should provide themselves with suitable cleaning equipment or utilize good cleaners which are already available at some points. Farmers contemplating the growing of forage seeds should be reminded that with only an ordinary fanning mill it is very difficult to clean grass or clover seeds into marketable condition.

CLEANING DIFFICULTIES CAN BE GREATLY MINIMIZED BY CLEAN CULTURAL METHODS. Setting seed in alfalfa. While successful seed-setting in alfalfa depends in general on weather and soil conditions, it has been found that individual alfalfa plants vary greatly in their fertility because of differences in their hereditary qualities. This fact being recognized, strains are now being bred by plant breeders, which it is expected will be much less sensitive to somewhat unfavourable environmental conditions. Hulling timothy seed. Severe hulling of timothy seed lowers the grade. Alberta seed, on account of the very dry atmosphere and the plumpness of the seed, is liable to hull badly in handling. Hulling may be avoided to some extent by cutting on the green side, by threshing promptly, by running the thresher slowly and by cleaning the seed as gently and infrequently as possible Growing clean seed makes severe cleaning unnecessary. Marketing organization. The Dominion Seed Branch and the Provincial Department of Agriculture collect and distribute information on current supplies and prices of grass and clover seeds. It is felt that there should be a marketing service for Alberta which would keep growers accurately informed and assist in marketing the seed. On the other hand, the statement has been made authoritatively that good clean seed has always found a market. Undoubtedly a great aid in marketing is the production of clean seed of good quality. Export market for forage crop seeds. It would appear that the possibilities of exporting Alberta grown seeds of grasses, alfalfa and clovers are quite real and encouraging. It has been reported on good authority that foreign countries are interested in buying our seeds, believing that northern grown seeds are superior, and feeling confident of their quality because of the single and efficient system of grading operative in all parts of Canada.

NOXIOUS WEEDS

The weeds that have been most recently introduced into this Province and are causing the greatest concern, demanding the attention of all persons and agencies interested in weed control, include Leafy Spurge, Hoary Cress and Russian Knapweed. Information regarding the control of these weeds may be secured from the Field Crops Branch, Department of Agriculture. However, a brief description and the occurrence of these weeds is reviewed herewith:

LEAFY SPURGE

Description:

The plant grows to a height of from fifteen to twenty-four inches The main stem is upright and branches profusely. The leaves are smooth, long and narrow. When broken, the stems and leaves exude a thick milky sap. The blooms, borne in umbrella-like clusters at the tips of the branches, resemb;e dense tufts of small leaves more than ordinary flowers; they are first yellowish green in colour, changing to more district yellow with maturity. The root is reddish brown in colour, woody in texture, and penetrates to a depth of from four to eight feet; it developes creeping root-stocks from which new plants originate. New growth starts quickly from the roots each Spring; the young plants before blooming resemble flax, and by their density completely crowd out farm crops.

Objectionable Characteristics of Leafy Spurge.

1. It propagates by both seed and root-stocks.
2. Once established, its deep, tough root system makes it a most persistent and difficult weed to eradicate.
3. The sap, exuding from the stems when cut or broken, forms a gum which is most troublesome, coating binder knives, machinery and even the legs of horses. This gummy substance cannot be removed by washing and it is scraped off only with difficulty.
4. Leafy Spurge is rated as a poisonous plant, but fortunately, on account of its bitter taste, live stock seldom eat this weed. It is quite conceivable, however, that hay or straw containing Leafy Spurge might harm or even kill animals, as the plant contains a poisonous substance.
5. On account of its hard root and the depth to which it enters the soil, a complete kill can seldom be obtained with one year's summerfallow.
6. It grows so thick and dense that no other plants can compete with it.
7. It develops seed early in the growing season, ripening an abundance of seeds.

Occurrence.

Leafy Spurge is a perennial weed, with widely spreading root-stocks. It is of European origin, but appears to thrive under all prevailing climatic and soil conditions found in this Province. Patches of this weed have been reported from many widely scattered districts. In certain districts in southern Alberta whole fields have been infested.

HOARY CRESS

Description:

Hoary Cress is a persistent, deep rooted perennial weed. The plants grow to a height of from one to two feet, with upright stems, and numerous branches if not too closely crowded; they are frequently covered with fine hair. The leaves are oval in shape, with distinct branching veins and regular edges. The flowers are small and white, only about one-eight of an inch in width, with four petals; they are arranged in tufts at the ends of branches, and give the plant a white top appearance. Seed pods form abundantly in clusters, each pod being a two-lobed sack and bearing a short spine at the tip. The roots penetrate deeply, are tough and woody in texture, and send out creeping root-stocks.

Wherever Hoary Cress becomes established it takes complete possession of the soil, crowding out all other plants. It propagates by both root-stocks and seeds, being a very profuse seed producer. The seeds will remain viable in the soil for many years.

Occurrence:

Hoary Cress was first reported in the Province in 1920, and since that time it has spread to several widely separated localities. Patches are mostly small as yet, but everyone should be on the watch for this weed, as it is proving to be an exceedingly difficult weed to eradicate.

RUSSIAN KNAPWEED

Description:

Russian Knapweed is a deep rooted perennial of foreign origin, having been imported from Europe. This plant grows from twelve to twenty-four inches in height, and is well branched. Short, stiff hairs cover the leaves and stems, so that the plant feels sticky to the touch. The lilac-coloured flowers are in small round heads and the mature plant has a shredded appearance. The leaves on a mature plant are small, narrow and smooth, with no pronounced point, and become smaller towards the tip of the plant. The root is dark brown in colour, very tough, and as much as half an inch in diameter. The root system is similar to that of Canada Thistle. The seeds are one-eight of an inch long, and about half as wide. They are bright white and resemble the seed of Bull Thistle. There is no notch at the end, but the surface of the seed has fine longitudinal lines.

Occurrence:

Russian Knapweed is found in small patches in several widely separated localities in the Province. The chief infestation so far is in the irrigation districts of southern Alberta. Farmers everywhere, however, should be on the lookout for this weed, as its perennial habit would indicate that it will prove to be an exceedingly troublesome weed wherever it becomes established.

REPORT OF COMMITTEE ON SOILS AND FERTILIZERS

The following report contains a summary of papers and discussions presented at the conference held in December, 1936. It includes the following subjects: "Fertilizers for the Gray and Black Soils", "Rotations for the Gray and Black Soils", "Rotations and Fertilizers for the Brown Soils".

Fertilizers for Gray Soils

The gray soils of Alberta are only sparsely settled at the present time. They are initially low in fertility, but by proper management, including the use of clovers and fertilizers, they can be made to produce satisfactory crop yields. Experiments conducted from Edson southeast to Sundre have given results similar to those obtained at Breton. Table 1 contains a summary of the more important results obtained at Breton.

On the continuous wheat series, not only were the yields much greater following fallow, but the increasesfrom the use of fertilizers following fallow were also much greater than on plots of wheat following wheat (See Table 1).

On the continuous wheat series the phosphorus alone was not beneficial, but it was beneficial in combination with nitrogen or manure. Ammonium sulphate was decidedly beneficial, and likewise "complete" fertilizer.

The cheapest fertilizer containing a high content of nitrogen and sulphur is ammonium sulphate. This is likewise an excellent fertilizer for the grains and the clovers.

Another good fertilizer containing high contents of nitrogen and sulphur, as well as phosphorus, is ammonium phosphate 16-20. This costs slightly more than the ammonium sulphate but is to be preferred for the first grain crop following clovers.

The "complete" fertilizer has given the largest increase in yield of clover, as well as of the first crop of wheat following clover. However, this is the most expensive fertilizer, and we are not yet prepared to recommend its use in preference to the 16-20 ammonium phosphate.

The growing of clover without the use of fertilizers or manure apparently will not build up our gray, wooded soils. The yields of wheat following clover on the unfertilized check plots were no better than the yields of the unfertilized continuous wheat plots in 1935 and 1936.

These fertilizers should be applied at the rate of 50 to 60 pounds per acre for the grain crops, but a somewhat lower rate of application may be sufficient for the clovers.

As a general statement covering all grains and legume crops the results might be expressed as follows: The increases in yields were from 2 to 4 times as great for both the fertilizers and the clovers when used conjointly as when used alone.

TABLE 1 - FERTILIZERS FOR GRAY WOODED SOILS

BRETON EXPERIMENTS

TREATMENT	CONTINUOUS WHEAT				FOUR YEAR ROTATION (CLOVER, WHEAT, OATS, BARLEY)			
	WHEAT AFTER FALLOW 1933		WHEAT AFTER WHEAT		CLOVER		WHEAT AFTER CLOVER TURNED UNDER	
	YIELD	INCREASE	3 YR. AV. 1934-36	AVERAGE INCREASE	6 YR. AV. 1931-36	AVERAGE INCREASE	5 YR. AV. 1932-36	AVERAGE INCREASE
1 CHECK	19.1 BU.	----	10.7 BU.	----	1399 LBS.	----	13.1 BU.	----
2 MANURE	27.8 "	8.8 BU.	13.2 "	2.6 BU.	2503 "	1147 LBS.	21.5 "	8.5 BU.
3 COMPLETE N+P+K (16-20 PLUS POTASSIUM SULPHATE)	38.7 "	15.8 "	14.3 "	3.9 "	5310 "	3997 "	39.0 "	26.2 "
4 NITROGEN (AMMONIUM SULPHATE)	38.2 "	13.4 "	15.1 "	4.9 "	4736 "	3466 "	31.4 "	18.7 "
5 CHECK	26.7 "	----	10.1 "	----	1228 "	----	12.5 "	----
6 LIME	27.5 "	0.4 "	11.2 "	0.8 "	2603 "	1268 "	18.0 "	4.9 "
7 LIME + PHOSPHORUS (TRIPLE SUPER)	33.0 "	5.5 "	12.1 "	1.4 "	3794 "	2348 "	25.5 "	11.7 "
8 PHOSPHORUS (TRIPLE SUPER)	25.6 "	-2.3 "	10.7 "	-0.2 "	3349 "	1794 "	21.2 "	6.8 "
9 MANURE + PHOSPHORUS (TRIPLE SUPER)	37.9 "	9.6 "	15.9 "	4.7 "	4079 "	2416 "	31.3 "	16.2 "
10 AMMONIUM PHOSPHATE 16-20	37.7 "	9.0 "	14.3 "	2.8 "	4979 "	3208 "	35.2 "	19.4 "
11 CHECK	29.1 "	----	11.7 "	----	1880 "	----	16.5 "	----

The practice of growing legumes and using fertilizers on these wooded soils, however, implies that sufficient live stock must be kept to ensure a home market for the extra hay.

Fertilizers for Black Soils

The black soils are in general the best soils in Alberta. They are initially well supplied with plant foods, but in many cases give decided responses to the use of fertilizers after being cropped for a number of years.

Table 2 contains a summary of the more important results obtained on the experimental plots of the Soils Department at the University.

When applied to gain crops nitrogen alone has not been beneficial. Phosphorus alone was decidedly beneficial. Nitrogen plus phosphorus has been no better than phosphorus alone. A complete fertilizer including potassium was more beneficial than phosphorus alone to wheat, but not to oats.

The plots receiving potassium in addition to phosphorus have generally ripened earliest. Phosphorus, also, has generally shortened the time necessary for maturity by two to ten days. Nitrogen has had no effect.

This experimental field has been cropped since about 1923. Many older fields in the black soil belt will give much greater responses to fertilizers, but others again apparently still contain sufficient available plant food. The safest practice probably is to test the effect of fertilizers on a small scale to determine whether its application is profitable.

The results obtained seem to indicate that from 30 to 40 pounds of either ammonium phosphate 10-48 or triple superphosphate would be suitable for the grain crops on the heavier areas of the black soils.

There is some evidence that for the lighter sandy areas within the black soil belt a fertilizer containing a high amount of nitrogen, such as ammonium sulphate or ammonium phosohate 16-20, will give best results.

A good many tests of different fertilizers for clovers and grasses grown on black soil have been made. Increases in yield varying from $\frac{1}{4}$ to 1 ton per acre for the first cutting have frequently been obtained, but so far no one fertilizer stands out as consistently superior. When asked for advice we generally suggest a fertilizer such as 16-20 ammonium phosphate which contains both nitrogen and phosphorus for grasses in the black soil areas.

Fertilizers for Irrigated Lands

Barnyard manure increases production of almost all crops on the irrigated lands of southern Alberta. The manure usually brings the greatest monetary returns if applied before growing high priced crops such as sugar beets and canning crops. Small applications up to 10 tons per acre applied to a larger acreage have given greater increases per ton of manure than heavier applications on a smaller acreage. The benefit of the manure is not all secured in one year, but may improve crops for several years after application. Heavy applications may cause cereals to lodge.

TABLE 2 - FERTILIZERS FOR BLACK PARK SOILS

EDMONTON EXPERIMENTS

TREATMENT	WHEAT YIELDS		OAT YIELDS	
	6 YR. AV. 1931-36	AVERAGE INCREASE	4 YR. AV. 1931-34	AVERAGE INCREASE
CHECK	32.5 BU.	----	65.0 BU.	----
NITROGEN (AMMONIUM PHOSPHATE)	33.2 "	0.7 BU.	64.7 "	-0.3 BU.
PHOSPHORUS (TRIPLE SUPER)	37.9 "	5.4 "	72.5 "	7.5 "
NITROGEN AND PHOSPHORUS (10-48)	37.9 "	5.4 "	72.2 "	7.2 "
COMPLETE N+P+K (10-48 PLUS POTASSIUM SULPHATE)	40.7 "	8.2 "	70.6 "	5.6 "

Of the mineral fertilizers, phosphorus and nitrogen are the only elements so far tried that have been of noticeable benefit. Crops on most of the irrigated soils respond to phosphates. This is particularly true of sugar beets and alfalfa, especially if alfalfa or other high phosphate consuming crops have been grown on the land for several years. Under such circumstances grains respond favorably to a phosphate application. Old alfalfa fields that are giving low yields are frequently restored by applications of phosphates. Grain has responded most when the fertilizer was drilled directly with the seed, while placing the fertilizer a fraction of an inch away from the seed has been most satisfactory for other annual crops. For alfalfa the phosphate is drilled directly into the alfalfa stubble. Non-leguminous crops usually respond to nitrogenous fertilizers and as phosphorus can be purchased in combination with ammonia as ammonium phosphate almost as cheaply as in the superphosphate form, ammonium phosphate is usually preferred.

Cultural Practices and Rotations

Cultural practices for the production of farm crops vary in different parts of Alberta just as much as the soil and the climate. In the south and southeast moisture is usually the most important limiting factor in crop production, whereas in the wooded areas in the west and northwest, fertility is usually low and is the factor which mainly determines the type of farming which must be followed. Between these extremes many diverse conditions exist.

The drier areas represented mainly by the brown soil types produce our wheat of highest quality. They are not adapted to the production of oats and barley and should be used mainly for the growing of wheat. Throughout this region, wheat and oats are likely to be more useful for the production of hay than are the perennial grasses, so that some of the grain will be normally cut green for feed.

The system of cultivation followed in these drier regions must allow for a considerable proportion of the land being fallow to provide for the storage of moisture. One of the safest systems is that which provides for two fields or alternate strips, half the land being in crop and half fallow. For convenience of reference this system of cultivation may be called Rotation Number 1.

Rotation II - three fields

1st year - grain
2nd year - grain
3rd year - fallow

This rotation is adapted to the same areas as Number I, but is better suited to regions where there is somewhat more moisture. Wheat should, of course, be mainly grown.

The dark brown and black soil belts, having a slightly heavier precipitation, a lower evaporation and a more fertile soil, are the districts in the Province of heaviest yield. The climate and soil conditions not only favour heavier yields of all crops but they encourage as well more weed growth, both annual, such as wild oats and stinkweed, and perennials, such as quack grass and thistle. Perennial grasses

and the legumes grown for hay thrive much better than in the drier regions so that it is possible to provide more feed for live stock and to use these crops to maintain fertility in the soil. Countries that have been farmed much longer than Alberta have found that to keep the soil fertile and to control weeds it has been necessary to adopt systematic rotations.

Any rotation to be satisfactory must include a considerable acreage of those crops which give the best financial returns. It should make provision for either a cultivated crop, a fallow, or a partial fallow to enable weeds to be held in check. It should also include a legume crop to build up the nitrogen content of the soil. A grass crop where it can be included adds to the fiber.

The rotation briefly outlined below have all been in use in central and northern Alberta and have given satisfactory results. The cereals all have a similar effect on the soil and can be interchanged to suit the particular conditions of soil and climate or the class of farming being carried on.

Rotation III - five fields

1st year - fallow
2nd year - wheat
3rd year - grain, seeded with clover and grass.
4th year - hay
5th year - pasture

Rotation IV - six fields

1st year - fallow
2nd year - wheat seeded down to clover and grass.
3rd year - hay
4th year - pasture, plowed in summer and cultivated.
5th year - oats or other grain
6th year - oats or barley

This is an excellent rotation for a farm in central Alberta where wheat of good quality can be grown and where considerable stock is carried. One half of the farm is in grain, one sixth in hay, one sixth in pasture and one sixth fallow.

Rotation V (a) - four fields - eight years

1st year - fallow
2nd year - wheat
3rd year - seed to clover and grass - no nurse crop.
4th year - hay
5th year - pasture, plow up in summer
6th year - wheat
7th year - oats or barley
8th year - oats for greenfeed

This rotation may be worked in four fields by making the following grouping, one and five, two and six, three and seven, four and eight. This eliminates considerable fencing and thus saves expense.

The following rotation is recommended by the Vermilion School of Agriculture for what is known as the black soils of the province:

Rotation V (b) - eight years

1st year - (After cereal crop of previous year). Spring cultivated, after wild oats, weeds, etc., are well started and seed about June 15th to sweet clover or Altaswede Clover with brome or crested wheat grass, together with Western Rye and Kentucky Blue.
2nd year - first hay crop largely sweet clover, or Altaswede Clover.
3rd year - second hay crop largely consisting of the particular grasses used.
4th year - spring pasture, then plow about end of June and cultivate.
5th year - spring cultivate and seed to wheat.
6th year - wheat, and fall disc.
7th year - spring disc and seed oats and barley; fall cultivate.
8th year - manure spread on stubble during winter; summerfallow during summer for grass seeding the next spring.

Rotation VI - four fields

1st year - grain
2nd year - grain, seeded to clover and grass.
3rd year - hay
4th year - hay or pasture, plowed in summer.

This rotation is suitable only for districts where it is not necessary to include a fallow in order to make provision for the conservation of moisture, e.g. the gray wooded soils.

Rotations for Irrigated Lands

Few irrigation farmers have been successful without adopting some form of crop rotation that helps to maintain the fertility of the soil and keep weeds in check. Alfalfa is the base of most irrigated rotations as it supplies nitrogen and helps in the control of most weeds. Sweet clover is especially suitable for short rotations and is useful to plow under as green manure. Beans and peas are two other legumes that are used on the irrigated farms and fit into rotations with non-leguminous crops. Weeds are difficult to control in peas so a weed controlling crop such as an intertilled crop should be included in a rotation containing peas. The ideal irrigated rotation should contain a deep rooted legume and a clean cultivated, intertilled crop.

Getting a Rotation Started

In establishing a rotation, it is not necessary absolutely to adhere to the plan laid out. It usually takes time to divide the farm into suitable divisions and to provide the necessary fencing. Arrange the cropping plan to insure that a field is not seeded so often to grain that it becomes very weedy, but seed it down to clover and grass to help restore the fibre and fertility and to help control the weeds. The aim should be eventually to get the farm divided into fields of approximately the same size and to follow the rotation systematically.

Pasture and Hay

It may be found convenient to have a small field near the buildings for pasture, in addition to the pasture provided in the regular rotation. Such a field should not be used for this purpose for more than four or five years at a time. It should be plowed up, taking off a few crops of grain, and seeded back to grass and clover. In the meantime another small field should be used to provide pasture.

Provision may also be made for additional hay by seeding a field to alfalfa and leaving it to produce hay as long as it remains reasonably productive. It can then be broken up and seeded to grain, ancther field being put in alfalfa for a few years.

Use of Manure

In districts where moisture is sometimes but not regularly deficient - much of central Alberta - manure can be used to excellent advantage on the grass and clover. To insure even spreading, a harrow may be used after hand spreading if a manure spreader is not available. The manure benefits both the grass crop and the grain crops that follow. When the sod is plowed the manure becomes better incorporated with the soil than when it is applied to stubble and plowed under. Manure can also be used effectively on land that is being fallowed. When it has been used in the fallow and a wet season follows there is a danger of loss through the crop lodging.

REPORT OF COMMITTEE ON CEREAL VARIETY ZONATION

In preparing this report the committee has endeavoured to serve two purposes: firstly, to distinguish between varieties which should and those which should not be grown in the Province of Alberta and, secondly, to indicate the sections of the Province to which individual recommended varieties are particularly well suited.

The boundaries of the zones indicated on the accompanying map are not hard and fast; they represent the approximate centres of more or less gradual transitions. This fact should be kept in mind in the interpretation of the recommendations made. The varieties recommended for the four zones are as follows:

(See map last page of this volume)

Wheat.

Zone 1. Canus and Marquis.
Zone 2. Marquis, Red Bobs and Reward.
Zone 3. Garnet (3b only), Red Bobs and Reward.
Zone 4. Garnet, Marquis, Red Bobs and Reward.

Oats.

Zone 1. Banner and Victory.
Zone 2. Banner, Legacy and Victory.
Zone 3. Alaska, Banner, Legacy and Victory.
Zone 4. Alaska, Banner, Legacy and Victory.

Barley.

Zone 1. Feed. Hannchen, Newal, Regal, Trebi.
Malting. O.A.C. 21.
Zone 2. Feed. Newal, Ragal and Trebi.
Malting. O.A.C. 21.
Zone 3. Feed. Newal and Trebi.
Malting. O.A.C. 21.
Zone 4. Feed. Newal and Trebi.
Malting. O.A.C. 21, Olli and Peatland.

Note: - The varieties are listed above in alphabetical order - not according to merit or desirability.

Flax.

Two varieties of flax are recommended for Alberta. In the relatively dry sections where frost is not a hazard, Bison should be grown. For the more humid section of the north, Redwing is recommended.

No attempt will be made in this report to give a detailed description of the various varieties. A few of the outstanding characters are given below.

WHEAT

Canus is a bearded variety with very strong straw. It matures at about the same time as Marquis, is immune to the forms of stinking smut commonly occurring in the prairie provinces, and has given some indication of drought resistance. It is recommended for zone 1 only, and is undoubtedly worthy of serious consideration. Since it will be fairly widely grown in 1937, it will be possible to make more definite statements next year. From the standpoint of quality, Canus is considered equal to Marquis for purposes of commercial grading.

Garnet is six or seven days earlier than Marquis, and possesses a remarkable capacity for high yield. From the standpoint of quality it is definitely inferior to the other recommended varieties and, for this reason, is graded separately. Garnet can be distinguished from Marquis in the field by its characteristically long narrow glumes and sharp beaks. Its production should be limited to areas where other varieties will not mature properly.

Marquis is too well known to require extended treatment on these pages. It is recommended for zones 1 and 2, and is included in the list for zone 4 since, in certain sections, it has given satisfactory results. In zone 3 Marquis is rapidly being displayed by Garnet, Red Bobs and Reward, chiefly as a result of the earliness of these varieties.

Red Bobs is completely without awns and, as a result can be readily distinguished from Marquis which bears tip-awns varying in length from 1/2 inch to an inch or more. Red Bobs is rapidly gaining in popularity in Alberta, chiefly on account of its high yield, strong straw and earliness; it is about four days earlier than Marquis. Red Bobs is not quite equal to Marquis in baking quality. Its inferiority is, however, slight and not serious. In this respect it is enormously superior to Garnet and, for this reason its expansion in the northern zones is gratifying. Red Bobs has one important defect; it has a marked tendency to produce "piebald" or starchy kernels under relatively moist conditions, especially in zone 4 and the northern and western section of zone 3. Despite this fact, it may well prove to be a more profitable variety than Garnet in these regions, and the grain produced will be of better quality.

Reward is characterized by exceptionally high quality; it is a day or two later in ripening than Garnet. Its chief drawbacks are relatively low yield and a tendency to produce green kernels. The latter defect is commonly a result of premature harvesting and can be largely overcome by allowing the crop to ripen fully. Reward may be distinguished from the other varieties by means of its hairy chaff. Improved strains of Reward have been developed, and one of these, No. 22-42, is being distributed by the Dominion Experimental Farm at Lacombe. For conditions to which Garnet or Red Bobs are not suited this new strain of Reward may well be given a trial.

OATS

Banner and Victory are recommended for all sections of Alberta in which early autumn frosts are not a hazard. The two varieties are quite similar in appearance and can be identified in the field only with difficulty. The grain of Victory is plumper than that of Banner.

Legacy is five or six days earlier than Banner and Victory. It is recommended for those districts in which Banner and Victory are too late in maturing to escape early Autumn frosts. Under ordinary conditions Legacy yields slightly less than the two latter varieties, the kernel is less plump; but due to its thin hull it produced a high quality feed oat. Even where early frosts are not a hazard, Legacy is useful for late seeding.

Alaska is about ten days earlier than Banner or Victory. It is definitely inferior in yielding capacity, but is useful for late seeding or in districts subject to early Autumn frosts.

BARLEY - Feed

Hannchen is a two-rowed, rough-awned moderately late variety. It is characterized by high yield, but its weakness of straw is likely to be a serious defect except under relatively dry conditions.

Newal is a six-rowed, smooth-awned variety with a remarkable yielding capacity. It is already very popular as a feed barley. Its chief defect is a marked susceptibility to loose smut, which may not prove serious. It is a day or two earlier and is noticeably stronger in the straw than O.A.C. 21.

Regal is another six-rowed, smooth-awned variety. It is only recommended for zones 1 and 2 because it is a day or two later than Newal and is more prone to lodging.

Trebi is a six-rowed, rough-awned variety characterized by very high yield. It is recommended for all zones.

BARLEY - Malting

O.A.C. 21 is, generally speaking, the most satisfactory malting barley for Alberta. It is a six-rowed, rough-awned variety with only moderately strong straw.

Peatland has given promising results when grown on grey wooded soils. It will not produce high quality malting barley when grown in the black or brown soil areas. It is inferior to O.A.C. 21. yield, but definitely superior from the point of view of strength of straw. Peatland is a six-rowed, rough-awned variety distinguishable from O.A.C. 21 by its white kernels. The kernels of O.A.C. 21 are bluish in colour.

Olli is a short, very early, six-rowed, rough-awned variety of high malting quality. It is especially suited to districts in which early Autumn frosts are common.

FLAX

Bison and Redwing are both high yielding, wilt resistant varieties. Bison is from two to four days (at Edmonton roughly ten days) later than Redwing, and is subject to lodging in the more humid sections of the Province. Redwing has remarkably strong straw, and is worthy of extensive trial in northern Alberta. Regardless of the variety used or the district concerned, early seeding is recommended Serious damage from summer heat and fall frost may result from late seeding.

It is to be hoped that the recommendations embodied in this report will be revised year by year. Great care has been taken to avoid the exclusion of any variety of wheat, oats, barley or flax which merits serious consideration in Alberta. As new varieties appear they will be carefully tested at the various experimental stations and, as a result, if useful new varieties become available, they will appear on the recommended list. In view of the careful consideration devoted to the subject by the cerealists of Alberta, and the gratifying unanimity of their opinions, it is safe to say that any variety not on the recommended list should not be grown in Alberta except for very special reasons. This is of minor importance in the case of cereals grown for feed purposes only. For example, in some sections of southern Alberta hooded (Sometimes termed "Beardless") barleys are quite popular. There is, at present, not sufficient evidence to justify recommending any variety of hooded barley in preference to the varieties included in the list. The same applies to hulless varieties. It is realized that for special purposes, or under certain local conditions, the culture of such varieties may be justified and no harm will be done. However, in the case of cereals grown for the open market, farmers render a disservice to themselves and to the country by growing inferior or mixed varieties.

One other amendment to the statement that varietied not on the recommended list should not be grown is necessary. No mention is made of winter wheat or durum wheat. Some farmers in certain districts find winter wheat a profitable crop, and a good deal of it is grown in Alberta. Because it is of minor importance, and because adequate information concerning its suitability in the different zones is lacking, no recommendations are made. The case of durum wheat is similar. From time to time it is claimed that durum wheats possess a high degree of drought resistance, but the claims have not been substantiated. If durum wheat is grown, the choice lies between the varieties Mindum and Pelissier; Golden Ball is of inferior quality and should not be considered.

At the present time a good deal of interest is being shown in three new rust resistant varieties of wheat, namely; Thatcher, Apex and Renown. It is unnecessary to undertake a discussion of their relative merits in this report because they are not recommended for Alberta conditions. Information at present available indicates that no one of these varieties possesses any merits not to be found in Marquis or Red Bobs, except resistance to stem rust. Since this disease rarely causes serious loss in Alberta, Thatcher, Apex and Renown are not recommended; their distribution would only serve to complete the already serious problem of varietal mixtures.

Apart from the specific recommendations it contains, this report merits the serious attention of all parties interested directly or indirectly in the agricultural progress of this Province. Too many farmers are growing mixed varieties and suffering more or less serious financial loss by so doing. For example, Marquis containing mixtures such as durum wheat, white wheat or Garnet will be degraded. Mixtures containing varieties of definitely inferior quality such as Huron or Stanley are all too common, and constitute one of several factors which together are threatening the reputation of western Canada for high quality wheat. Another point requiring emphasis is this: Farmers are often much too ready to try new varieties - good, bad or indifferent, but above all things, <u>new</u>.

In order to maintain purity and a high level of quality, it is essential to keep the number of varieties grown in any one district at a minimum. In districts in which durum wheat is grown, some of the hard red spring wheat is sure to contain mixtures of durum, and this holds for other varieties of hard red spring wheat though the consequences may be somewhat less serious. Three things, therefore, are necessary if the purity and quality of Alberta cereals are to be improved. (1) Eliminate all mixted varieties; (2) eliminate all old inferior varieties; and (3) discourage the adoption of new varieties until they have been adequately tested. If this is not done pure stands of high quality varieties will never be a feature of Alberta agriculture.

Seed Treatment in Relation to Seed Production

Seed treatment if properly practised should materially assist the seed grower in the production of a uniform high quality product and a maximum yield of it.

The seed grower cannot afford to be indifferent about seed treatment. On account of the value of his stocks and to guard his reputation he must use the best methods of seed treatment known.

Evidence has been accumulating which indicates that the new organic mercury dust trearments such as New Improved Ceresan, Standard Leytosan and Leytosan P are better for general use on grain crops that the old liquid treatments like formaldehyde and copper sulphate.

An important advantage is that when properly used they are considerably safer than the latter treatments. One may expect not only an increased germination over formaldehyde treated seed, but as well a more vigorous and better yielding crop. It has been found that formaldehyde not only injures seed, but it also tends to make the plants from treated seed more susceptible to certain forms of disease and insect damage.

Organic mercury dusts control the same diseases as formaldehyde and some that formaldehyde does not.

They may be used to advantage on the same seeds as formaldehyde and on some in addition, e.g. flax.

They give greater protection to the seed than formaldehyde, and are much preferable if the seed happens to be damaged from frost or shrivelled by other agencies.

Suitability for application ahead of seeding time is another advantage claimed for the organic mercury dusts, but one which the seed grower may well be cautious about. Until further information is available, he should plan to have his grian sown within a month after treatment.

Considering the above advantages of the organic mercury dusts over formaldehyde and the lack of other substitutes, the seed grower has good reason to adopt them. If his problems include loose smuts of wheat and barley, however, he must still rely on the hot water treatment for their control.

REPORT OF COMMITTEE ON CROP PESTS AND DISEASES

The wheat stem swafly (Cephus Cinctus Nort.) is rapidly becoming one of the most serious pests of wheat in Alberta. In the last few years it has spread extensively over the southern part of the province, increasing in numbers and economic importance.

The females deposit their eggs in carefully selected stems of grains and grasses, usually the most advanced and strongest stems available. The larvae feed inside the stem, retiring to the base and cutting the stem at the soil surface just before harvesting.

Trap crops provide the most effective control for the wheat stem sawfly. Oats and brome grass are the most effective traps, since the larvae do not mature in these plants. Wheat, barley, rye and most grasses can be used as traps, but must be cut for hay the latter part of July to destroy the insect. To be effective, any trap crop must be more advanced than the crop to be protected, so that the female sawflies will be attracted to the well developed stems for egg-laying. Brome grass seeded on road allowances and headlands provides an excellent permanent trap crop, while other trap crops may be seeded as a border two rods wide around the field.

A new insect pest, Say's grain bug (Chlorochroa sayi Stal), has invaded Alberta in the last two years. Originally studied in New Mexico and Arizona where it is a spasmodic but not serious pest of wheat, it suddenly appeared in Montana in considerable numbers in 1931, increasing each year and causing serious loss to grain crops.

Say's grain bug is a large, green "stink bug", one-half to three-quarters of an inch long and almost as broad. All stages feed on weeds, and when grain is in the milk stage they suck the juice from the kernels. There is no external evidence of feeding, but the kernels are shrivelled and usually so small that they go into the weed box of the thresher or are blown out with the chaff.

The insect winters in the adult stage, hiding under weeds or trash on the ground. Burning stubble and weed accumulations in the early spring is the most effective control at present, but this cannot be used in areas where soil drifting is prevalent.

The Control of Wire worms in Alberta

The most improtant factor in reducing the number of wireworms in a field is to avoid all deep cultivation - particularly in spring and early summer. The object of this is to keep the adult beetles near the surface when they are laying their eggs. If this can be accomplished by keeping the deeper earth too firm for them to burrow into it, very few of the eggs which they lay will hatch.

Avoid Spring ploughing at all times. When summerfallowing, cultivate repeatedly to a depth of not more than 2" to 2½" up till the middle of July. This will germinate and destroy the weeds. A slightly deeper cultivation or ploughing, which should not exceed three inches, during the last half of July will destroy the pupae of maturing wireworms.

The rate of maturation of individual wireworms is very variable. Some can mature in as short a time as three years; others require at

least eight. Though their numbers vary little, in any field from year to year, conditions of soil moisture and temperature have a marked effect on the damage they will do. They rarely cause severe damage in the same field for two years in succession. It is for this reason that many people have great faith in seed treatments, of one kind or another, for reducing damage. They almost invariably employ the treatment in a year following unusually heavy damage.

No known seed or soil treatment, which can be employed in grain fields, is of any value in the control of wireworms.

In order to reduce damage in a badly infested field, seed only with grain which has a high germination test; under no account treat it with formaldehyde; try to seed only when moisture and temperature conditions assure a rapid germination and growth, and do not seed more deeply than is necessary to assure complete germination.

It is often advisable to seed a little more heavily than one would in a field in which wireworms are scarce.

The Diseases of Leguminous Crops

In the short time available, attention was directed to an illustration by lantern slides of the four different rootrots of sweet clover and alfalfa prevalent and important in Alberta. The diseases indicated have only recently been studied and identified, and, therefore, the information is new and of special interest to agricultural officials, who may be called upon to examine cases of winter injury in these crops.

In general, the four rootrots look somewhat similar, although they can be identified by one accustomed to the more minute symptoms. Hence it is important that samples be forwarded to the Dominion Laboratory of Plant Pathology at the University for identification and study. More material at this stage in the work will greatly assist toward the identification and study of other rootrots which may be present in our fields.

The point stressed throughout was that the damage from all four important rootrots is greatest during a short period while the soil about the roots is thawing at the end of winter. However, two of the parasites involved will attack the roots to a lesser degree during summer, while the other two involved do not. Hence, much of what has heretofore been called winter-killing is undoubtedly a case of disease. This, of course, does not preclude winter-killing of the less hardy varieties, which, in general, succumb more readily than the hardy ones commonly grown in Alberta. Thus, the information given finally disposes of the possibility that the fungi in the tissue are a result of winter injury. They are indeed the cause of destruction of the tissue.

Regarding control, crop rotation is beneficial, but this phase has not been adequately studied. In testing for varietal resistance to the rootrots, certain varieties appear to be more resistant than others, but much work is necessary before anything final can be stated. It is hoped that these studies will provide material for breeding greater resistance.

Recent Developments in the Use of Fungicidal Dusts for Seed Treatment

Seed treatment is of necessity generally practised on the grain farms of western Canada for the prevention of smut and other diseases caused by seed-borne organisms. In addition, other beneficial effects may result from seed treatment, especially with the recently developed organic mercury dusts.

In the past there has been a marked tendency to regard the practice of seed treatment too lightly. The fact that there is danger to the seed and subsequent crop from certain seed treatment practices has not been sufficiently recognized. This is particularly true of the old liquid treatments such as the copper sulphate or blue stone treatment and the old but still widely used formaldehyde treatment.

Very serious injury may be done to seed grain by formaldehyde, especially if an overdose is given, an all too common error. Even when properly used there is still danger of seed injury by formaldehyde. It is noteworthy that soil conditions at seeding time in many parts of western Canada frequently favour seed injury by formaldehyde. Injured seeds not only germinate poorly, but they tend to produce weak plants which are slow to develop, and in consequence are more subject to the attacks of deleterious fungi and insects, such as the Take-all fungus and Wireworms. A reduced yield is commonly the end result.

Although formaldehyde is a cheap and reasonably efficient fungicide, its use is seriously open to question unless its injurious qualities are removed. This may be done, at least to a considerable extent, by washing the seed with water after treatment. Such a procedure, while complicating the treatment, would, it is believed, where sufficient water is available, well repay the labour necessary.

An easier way to take much of the risk out of seed treatment is to use one of the new dust treatments. The latest developments in such treatments are the prganic mercury dusts such as New Improved Ceresan, Standard Leytosan and Leytosan P. These if properly used will not only control smut diseases, but certain other diseases as well, and may by reason of protecting apparently clean seed from rotting in the soil, improve its germination and often the yield of the crop from it. Wheat from clean seed treated with such dusts at the University of Alberta has yielded in several tests from 1 to 6 bushels per acre more than that from like seed treated by the old formaldehyde method.

Present indications are that the organic mercury dusts will have a considerably wider range of usefulness than formaldehyde and other older treatments. For instance, in addition to finding them valuable for the small grains, wheat, oats and barley, we have also demonstrated important beneficial effects on other seeds such as flax and canning peas.

It is possible to treat ahead of seeding time with the mercury dust treatments, whereas this is not advisable with formaldehyde. This advantage, however, should not be abused, as prolonged storage of treated seed may cause seed injury. Tests made in 1936 indicated that, for

dry wheat treated with recommended rates of the above mentioned mercury dusts, periods up to a month were relatively safe periods of storage.

Mercury dusts have proved more valuable in protecting seed from recontamination and rotting than copper carbonate and formaldehyde. They have proved particularly beneficial to injured seed such as that damaged by frost, disease or other agencies.

Some precautions, however, should be observed in using mercury dusts. While it is unlikely on account of the expense that overdoses will be given, it should be realized that higher rates of application than those recommended by the manufacturers may cause serious seed injury, and hence should not be used; also that there is danger of injuring damp grain. Furthermore, those handling these dusts should remember that they are poisonous to humans and live stock, and consequently should bear this in mind in applying them and in storing unused supplies as well as treated grain.

Report of Committee on Cattle Production Programme for Alberta

In any discussion dealing with the question of a more orderly cattle production programme for the province of Alberta, recognition must be given to the fact that a wide variety of conditions prevail in this rather far flung province, a diversity of soils, climate, and topography, which in turn control crop and feed production, stock water supply, shelters and all those factors that are so closely linked up with live stock production. There is still another feature that should not be overlooked - the type of people on the farms. Their racial origgin, tradition and experience all bear directly on the subject under discussion.

With this in mind, it is obvious that without further definite information based on careful studies it is difficult to outline a definite programme of cattle production that would, with a very few exceptions, be suitable for any well defined area. On the other hand, it was felt that certain recommendations could be made that would form the basis for a more constructive policy for the future.

There are a few fundamental principles that are closely allied to the business of live stock production and that apply partivularly to the cattle industry that should be set out clearly.

The maintaining of farm live stock in many of the areas under discussion must be considered in relation to good farm practices. Experience has shown that in order to maintain the productive capacity of the soil, it is necessary to include crops other than cereals. This means that as the agricultural development of these areas goes forward, more land should be devoted to hay and pasture crops. This in turn suggests a market for them through the medium of farm live stock, and in this connection cattle offer some advantages in the disposing of such roughages as compared to some other classes of animals. On the other hand, cattle naturally have to compete with other classes of farm animals, and in this respect beef production has not been in too favourable a position for a number of years, especially compared to the swine business.

The experience of the past number of years has made it abundantly clear that the maintaining of cattle herds in some sections of this province has been a hazardous business, resulting in much discouragement and financial loss. A successful cattle enterprise can be developed satisfactorily only where there is a reasonable assurance of adequate feed supply. Where such conditions do not prevail, the only logical solution is to discourage the building up of breeding herds and to confine cattle production on a basis where liquidation can be rapidly made without taking any serious loss.

The recognized natural grass or so called range land in the south and south west parts of the province, where satisfactory natural resources exist, may be considered as beef producing areas and for this reason offer little or no problem in connection with cattle distribution in the province.

The semi range districts north of the south Saskatchewan river, extending in a north-westerly direction as far west as Range 18 near Drumheller, and from there north east to Township 37 and bordered on the east by the Saskatchewan boundary, is an area that at present is in the transitional stage and presents some problems that will take time to

work out satisfactorily. This, however, is in the hands of competent, experienced men who are giving it careful study, and your Committee felt that for the present no definite suggestions with respect to cattle production should be offered until further information is available. Undoubtedly cattle raising will eventually find its place in the general adjustment that is now taking place.

In those areas adjacent to the larger urban centres, the demand for fluid milk will mean that cattle production will lean largely towards strictly dairy herds.

Outside of these areas already mentioned, and they constitute a relatively small part of the total area of the province, the question of what type of cattle production to follow is not so clearly indicated. The remaining areas are large and conditions vary so greatly that it was considered inadvisable to go further than to offer a choice of a few cattle enterprises that could very well fit in to conditions as they prevail in these particular areas. These are listed and discussed as follows:

(1) Dairying: combined with swine production together with the possibility in some cases of finighing feeder cattle.

On the smaller farms in the arable districts where the matter of feed supplies gives little or no concern, and more especially where there is an available outlet for dairy products, dairying has an appeal to a considerable body of Alberta farmers. The fact that it fits in so well with swine production - a profitable source of revenue on so many farms - is another reason why dairy cattle may become increasingly popular. It is important, however, to point out that the calf increase from these herds should not find its way into the beef trade except in the form of veal.

On some farms where dairying, for various reasons, may not prove the most desirable outlet for all farm crops, the finishing of cattle either during the winter in dry lots or on grass supplemented with grain, may offer a choice.

(2) Baby Beef:

In those areas or in the case of particular farms where the holdings are somewhat larger, where winter feed production is assured and where a certain amount of rough or unarable land is available for pasture, the maintaining of a commercial breeding herd for beef production might find a place. Beef cattle production, speaking generally, is linked up with cheap land and it is very doubtful if, on the more productive land, it is profitable to maintain a cow the entire year for the purpose of raising a calf. In the case of cheaper land, however, the mother and calf can be carried through the grazing season fairly cheaply and the calf crop sold as fed calves. This programme calls for winter finishing and it is possible that in addition to the calves that are raised, additional feeders may be bought, and in this way feed disposed of in seasons of surplus supply.

(3) Finishing:

This system of marketing farm crops has some features that recommend it to a number of cattlemen. It fits in to a season of the

year when farm work generally is not so pressing. In those areas where feed supplies are uncertain, which makes cattle breeding more or less hazardous, the finishing business fits in to advantage. In years of unlimited supplies of feed, the necessary number of cattle to dispose of the feed may be purchased, while on the other hand, in seasons of short crops, the number can be reduced, or if necessary eliminated altogether. In this way there need be no reason for sacrificing cattle - a condition that has prevailed all too frequently in years past in the cases where breeding cattle have been kept.

It might be mentioned also that in any plan looking towards the development of a more permanent beef industry, the matter of finishing more native cattle is in the right direction and links up to advantage with the production of cattle on the range. There is another phase of the finishing business that might receive more attention, and that is finishing on grass with supplementary grain feeding and the cattle marketed during July and August when very few grain fed cattle are offered. Such cattle could be carried through the winter rather cheaply, and on farms where grass is available this might be found a profitable way to capitalize on this particular crop. Conditions on other farms might lend themselves to fall finishing which would involve purchasing yearlings or two-year-old steers off the range in August or September providing pasture such as rape or cultivated grasses and grain feed for the late fall or early winter market. A number of farmers are working this out quite successfully with lambs, which suggests the possibility with cattle.

(4) Combination of beef and milk:

It would appear that any discussion bearing on a cattle policy for Alberta would not be complete without mentioning dual purpose cattle. The possibilities of dairying combined with swine production for certain sections of the province has already been mentioned. Within this same general area a plan of combined beef and milk may offer a satisfactory substitute. In cases where an outlet for dairy products is not reasonably accessible, and where certain farmers naturally have a preference for beef production rather than milking cows, they may find the dual purpose cow might fit in to their general farming scheme. Cows showing good udders, giving evidence of fair milk propensities, and at the same time set on reasonably short legs with deep bodies, level in top and rump and up to a fair size, are found amongst the Shorthorn and Red Polled breeds and many of t these have given a good account of themselves from the stand point of beef production as well as milk flow. Up to 6,000 or 7,000 lbs. of milk per year might, under good feeding conditions, be expected, and a herd of from 6 to 12 cows, headed by a good beef bull, and properly handled, would provide quite a substantial source of farm income. The entire herd could be hand milked, the cream disposed of and the calves raised on the skim milk. It should be stressed, however, that considerable care and experience is necessary in order to rear satisfactory calves under this system. The policy should be to dispose of the calves as finished animals at an early age (12 to 16 months) rather than attempt to carry them over as older cattle. There is another possibility in the case of a dual purpose herd, and that is to allow two calves to nurse one cow and hand milk the balance. In this way the question of milking any large number of cows is simplified, and there is the added advantage of being in a position

to produce a more desieable type of beef calf. At any time one wished to change over to a strictly beef programme, then all the cows could be used for nursing calves. In other words, this plan of cattle production has the advantage of flexibility, a feature worth while in live stock production.

(5) Purebred Breeding:

The breeding of purebred live stock of any kind should be considered a specialized business, one requiring experience, knowledge, and a genuine liking for this particular business. It is obvious, too, that the building up os a herd of high class animals, especially in the case of cattle, requires years - often a lifetime - of constructive breeding. This suggests that it should be undertaken only in those areas where the question of feed supply is not in doubt. It should also be stressed, that the primary business of the purebred breeder is the production and distribution of desirable herd sires to head commercial herds rather than the sale of females. It is also true that the financial returns from the purebred cattle breeding business are too often disappointing as compared to the production of good commercial cattle.

Having regard for what has been said with respect to the purebred cattle business, the suggestion is that careful consideration should be given before any move is made toward expansion of this phase of cattle production.

Report of Committee on Swine Policy

Areas of Swine Production:

While swine raising in Alberta may be advocated under a rather wide variety of conditions, the main centres of production will undoubtedly be the areas where mixed farming is practiced. In these areas there is reasonable assurance of a steady supply of coarse grains and in addition dairying in some form will, in part at least, supply by-products which supplement the grains to great advantage. In the more strictly grain growing areas swine raising may be included in the production programme when the hazard of crop failure is not too great, and when there is an appreciation of the necessity for careful feeding and management methods. Having in mind the production of uniformly high quality bacon in Alberta, and with due regard to the position which Alberta holds as a contribution to Canada's export quota, the raising of pigs should not be encouraged in areas or on farms where facilities are inadequate or where there is an attitude of letting the pigs "shift for themselves."

Production Programme:

It is believed that swine raising can be advocated in Alberta on a year in and year out basis and that this enterprise can be carried out with a sense of security with respect to market outlets not enjoyed in connection with other types of livestock production. Past records show that while occasionally prices fall to a point where production costs exceed the selling price, the loss periods are of relatively short duration and taken over a period of years there is a safe margin between cost of production and selling price. Continuity of production requires emphasis so that fluctuations in production year by year may be avoided. The producer who endeavors to be in the pig business in a large way when grain prices are low and who "unloads" when grain prices rise, contributes to a condition of unstability and is a menace to the swine business.

It is not possible to suggest what treatment Canada may receive on the British Market following revision of trade arrangements in the fall of 1937, but it is felt that any changes which may take place will not have any marked depressing effect on Canadian hog prices. A sound slogan for pig production in Alberta would seem to be "steady production, consistent improvement in quality and a increas in swine population."

Regularity of Marketings:

Monthly deliveries of hogs to stock yards and packing plants in Alberta tend to be very erratic. Receipts during the fall and early winter months are heavy as compared with those of the spring and summer months. This situation has a depressing effect on fall prices and works against the maintaining of uniform supplies of Canadian bacon on the British Market. Since Alberta is the most substantial contributor of all the Provinces to export volume, it is extremely important that everything possible be done to improve this condition. The scattering of farrowing throughout the various months of the year (with the possible exception of November, December, January and February, unless housing and management are extremely favorable) would exert the greatest stabilizing influence, but a concentration of farrowing during March, April and May, and August, September and October, may best suit average

conditions. It is usually not possible to have all sows farrow both spring and fall litters but an average of three litters in two years is a regular procedure among good pig producers. It should be borne in mind that winter pig production in Alberta presupposes adequate shelter and careful attention to balanced rations.

Systems of Swine Production:

Under average Alberta conditions a semi-open air pasture system of production is recommended. Succulent pasture, and if feasible a succession of pastures, should be provided. Pasture lots should not exceed from ½ acre to 1 acre in size and where a larger area is demanded cross fencing is strongly recommended. Pasture is provided as a supplement to grain feeding and not as a sole means of sustenance. Full feeding of grain with pasture should be urged, preferably by the use of approperly constructed self-feeder. A sound summer feeding plan would embrace (a) placing pigs on pasture as soon as possible after weaning, (b) full grain feeding on pasture until a weight of approximately 150 lbs. has been reached, (c) pen finishing from 150 lbs. to approximately 200 - 210 lbs. at the farm.

On farms where commercial pig raising is more specialized and where suitable buildings are available, a system of intensive inside production can be suggested as feasible. Pigs are pen fed from weaning time until finished for market. Feed costs compare favorably with pasture production when full grain feeding is practised. Under such a system careful attention must be paid to protein, mineral and vitamine requirements.

Use of Protein, Mineral and Vitamin Supplements:

When an adequate amount of skim-milk or buttermilk is available there is little necessity for the purchase of supplemental feeds. When milk is scarce or entirely lacking, the purchase of supplements can be amply justified on the basis of grain saved. Tankage is the most available and usually the most economical and its use increases the rate of growth and reduces production costs as well as insuring a market hog of superior quality. The use of the more complex protein supplements being placed on the market instead of tankage is not justified if the price is more than from 25% to 30% higher than tankage.

The use of simple minerals is recommended. In districts where slacked coal is available it is suggested that a mixture of slacked coal 75 lbs., ground limestone or air slacked lime 4 lbs., salt 20 lbs. and sulphur 1 lb.,be placed before the pigs (protected from rain and snow). When this mixture cannot be conveniently prepared the addition of 1 lb. of ground limestone and 1 lb. of salt to each 100 lbs. of grain will provide for the mineral needs of growing pigs. If milk or tankage is being fed the amount of lime may be reduced by one half.

When pigs are closely confined after weaning, either in the spring or fall, the feeding of cod liver oil at the rate of ½ oz. per pig daily or at a level of 1% of the grain mixture, until they weigh approximately 100 lbs., will assist in preventing crippling and will aid in avoiding respiratory infections.

Values of Farm Grains:

The common cereals grown in Alberta provide a basis for good

rations for bacon hogs. A common weakness lies in the excessive feeding of oats. Even following weaning, oats should not constitute more than 50% of the ration. The balance may be made up of barley or (and) wheat. Oats should be reduced to not more than 20% as the feeding period advances or eliminated entirely during the finishing stage. Mixtures of grains give better results than the feeding of a single grain. In areas where rye is grown it may be substituted for part of the barley or wheat, but preferably should not constitute more than 1/3 of the grain mixture. The excessive use of oats is responsible for much unthriftiness in young pigs and, as well, lack of finish at market weight.

Farrowing Losses:

Heavy losses of spring pigs commonly occur in Alberta. Some are due to uncontrollable factors but many are undoubtedly the result of improper feeding and management methods.

Proper feeding and exercising of the brood sow is to be urged. The use of protein supplements and simple minerals, together with alfalfa hay (or some form of green roughage), roots when available, and potassium iodide will assist in the production of vigorous pigs at birth. Many losses are due to laxity in the matter of using potassium iodide. Hairless or weak pigs result. This drug may be given in solution - 1 oz. potassium iodide in 1 gallon of water - 1 tablespoonful per sow per day, or mixed in salt, 2 oz. in 100 of salt, feeding the salt at 1 lb. in 100 lbs. of grain. The most important primary and secondary cause of loss, particularly in early farrowed pigs, is thought to be anaemia. The critical period is when pigs are from 10 days to 4 weeks of age. Prevention lies in the daily administration to each pig (over a period of at least 2 weeks) of 1 teaspoonful of a solution made up of 3 oz. iron sulphate and $\frac{1}{2}$ oz. of high grade copper sulphate in 4 quarts of water. Good results can also be obtained from placing in a corner of the pen of the sow and litter a foot square turfy sod which has been sprinkled with a quantity of the iron and copper solution. Precautionary measures to prevent anaemia are important. Chilling of pigs during the nursing and after weaning stages should be avoided as far as possible.

Internal Parasites:

It is believed that on the majority of farms the common round worm is a cause of unthriftiness and even direct or indirect loss of many pigs. Preventative measures assist materially in avoiding infestation and sanitation cannot be too strongly recommended. Among the parasiticides which may be recommended are, (1) Nema capsules (Parke Davis Co.) which vary in size for pigs of different weights, (2) Oil of Chenopodium, 1 drop for every two pounds live weight of pig, mixed in feed, (3) Santonin in dose of $2\frac{1}{2}$ grains for a 50 lb. pig.

Swine Diseases:

Attention is drawn to the fact that, arising out of requests made by livestock organizations in Western Canada, the Dominion Department of Agriculture is giving careful consideration to a research programme relating to swine diseases.

Breeds and Systems of Breeding:

Since the objective in Alberta is the production of a high percentage of hogs of select bacon grade, it is agreed that the use of Yorkshire blood should be generally advocated. As a result of greater length and the white color, the Yorkshire will more rapidly bring the pig population up to bacon standards than any other breed. In the selection of Yorkshires, constitution, feeding capacity and good fleshing qualities should be emphasized.

In cases where an alternative to the Yorkshire is demanded, the Tamworth may be regarded as the best alternative.

The crossing of these two breeds usually results in the production of a hardy, good feeding pig of acceptable market type. Cross-breeding should usually only be recommended when a producer will market all cross bred pigs, although gilts of this cross bred back to a Yorkshire boar will produce all white pigs. A second cross of this type is not objectionable.

While in the hands of a careful and constructive purebred breeded line breeding and inbreeding may occasionally give exceptional results, the practicesshould not be generally recommended. It should be avoided in commercial pig production.

Advanced Registry for Swine:

In view of the fact that a pig testing station has been established in Alberta, attention is drawn to the policy of Advanced Registry for swine. It is felt that progressive purebred breeders, and particularly those with a reasonable number of sows, should be encouraged to have their sows tested under this plan. The scheme provides a basis for measuring the breeding worth of sows and in terms of a long time breeding programme should lead to the development of superior types, and strains which will reproduce more uniformly and more economically. It is hoped that the results secured in Denmark from testing can be emulated in Canada.

Rail Grading:

As a further development in the direction of more discriminating buying of hogs, the principle of rail grading appears sound. In Alberta hogs may be sold on a basis of either live or rail grade. Grading of the live hog has been productive of good results but rail grading can be carried out on a more detailed basis and provides a means whereby the better type of producer may benefit by the production of a superior article.

Under rail grading, hog carcasses are graded by officials of the Dominion Live Stock Branch according to weight, quality, type and finish (see leaflet "Hog Grading Regulations" - Live Stock Branch, Ottawa). Payment is made according to the actual dressed weight yielded. In arriving at the price to be paid for carcasses of the basic grade (B1), an average dressing percentage of 74.5% is used, and calculating from the price of the basic live grade (bacons) the rail price is determined. For example, if the price for the bacon grade is $7.50 per cwt., the price paid for the basic rail grade is $10.00 per cwt. The calculation, taking a 200 lb. hog, is as follows: - 200 x $7.50 = $15.00 ÷ 149 (dress wt.) = $10.00 per cwt.

The seller whose hogs dress out above the average in dressing percentage receives a higher price than the average, while tha one whose hogs yield a lower dressing percentage than the average receives a lower price. In view of the fact that weight is an important factor in determining rail grade, the aim should be to market pigs at weights not exceeding 210 lbs. at the farm.

Swine Shelters:

With increasing interest in the matter of better housing conditions for swine, a demand has arisen for plans and specifications for a variety of types of hog houses. This proble is being studied at the present time by Provincial Government, Dominion Government and University representatives and it is hoped that a reasonable selection of plans, together with specifications and bills of materials, will be available at an early date. As pig production in Alberta takes on greater permanency, the matter of buildings for this unit of the farm enterprise must receive careful consideration. Temporary shelters, including the use of straw stacks and the straw-frame type of structure, undoubtedly render good service, but with the tendency toward an increase in infectious diseases and parasitic infestation, the necessity for shelters which can be maintained in a more sanitary condition becomes apparent. This is particularly true on farms where pig raising is to be carried on as a regular part of the farm programme, and where early spring and late fall farrowing may take place. In connection with the erection of permanent swine buildings, it should be borne in mind that the investment should not be out of line with the volume of production, so that excessive overhead on the basis of annual production is not incurred.

Report of Committee on Poultry Policy

The revenue from the poultry industry in the Province of Alberta amounts to about $6,000,000 a year. This revenue is made up from the sale of commercial eggs and poultry, baby chicks, breeding stock, and the home requirements of the farmers themselves.

During the past few years when agriculture was undergoing a heavy economic strain, poultry proved its worth. In a well balanced type of agriculture suitable to Zone 3, poultry is one of the important branches In Sections of Zone 2 where wheat is such an important source of income and where drouth and hail in certain years have reduced the returns from wheat, poultry flocks of from 300 to 700 birds have proven to be a reliable source of income, and the weekly returns from poultry have paid the grocery bill, bought clothing, and binder twine, and have kpet the farm machinery in repair.

On many of the farms in Alberta, only sufficient poultry is kept for the farmer's own requirements, with possibly a small surplus at certain seasons of flush production. Under these conditions flock replacement will be made by hen reared chicks. Even under these conditions, however, poultry should be furnished with suitable living quarters. This may be a corner of the barn where the heat from other animals will help to keep them warm, but in any event, they should be kept in their own place so that they will not be a nuisance around the farm buildings.

The methods of feeding and management, and the kind of feeding utensils as described later, can be worked in on a smaller scale for family flocks such as these. In the case of these smaller flocks, a utility breed such as Barred Rock, White Wyandottes, or Rhode Island Reds will best meet the conditions.

Poultry as a Recognized Source of Revenue

As a recognized department of the farm and a source of revenue, poultry is increasing in importance. Under these conditions, flocks of 200 to 500 birds are common, and a bred-to-lay strain of poultry is essential in such circumstance. The White Leghorn is among the most popular, and is followed closely by bred-to-lay Rocks, Reds, and Wyandottes.

Poultry Houses and Equipment

In a climate such as we have in Alberta, poultry housing of necessity must receive special attention. Under no circumstanced should buildings be commenced without first obtaining plans suitable to Alberta climatic conditions. A location should be selected, if possible, on the opposite side of the farm residence from the barnyard. The building will give better results if it is located on a dry elevation and faces south. The building itself must be warm, dry, and well ventilated. The house is made 20 feet deep from front to back, 6 feet 4 inches high, and long enough to provide 3 to 3½ square feet for each bird to be housed. A building 20' x 30' will accommodate approximately 200 birds.

The windows, located on the south side, will constitute one-quarter of the front wall, and glass should be used for this purpose. The window openings may be covered with wire netting so that when they are

open, the birds will not escape.

The floor, which should be 6 inches higher at the back than the front, can be made of either cement or boards, cement being preferred.

Ventilation will be provided by means of fresh air inlets in the front wall, the air coming in at the bottom between two pair of studs, and being released in the building at the ceiling. The foul air will be drawn off by means of large ventilator shafts running from a point 10 inches above the floor and extending 3 feet above the roof. One such ventilator will be required for each 100 hens. The area of the exhaust shaft should be one-fifth larger than the area of the fresh air inlet. A door should be made in the ventilator shaft at the ceiling to be opened during mild spells in the winter, and through the summer months.

Such a building may be constructed either of lumber or sod. Sod houses are becoming increasingly popular in certain areas. If the building is to be made of lumber, it should consist of three ply of lumber and two ply of paper, with 6 inch studdings, and the space between the studdings packed tightly with planer shavings, peat moss, or other insultaing material. The ceiling is solid boarded and the door is placed in the front or the end wall close to the front.

A poultry house to be complete should be equipped with dropping boards 5 feet wide, extending along the north wall, and placed 30 inches from the floor. The perches located 12 inches above these, and running parallel with the end walls are spaced at 14 inch centres. The nests located on one end wall will be placed tier upon tier, each nest being 12 inches wide, 12 inches high, and 16 inches deep. In front of each tier of nests there should be a running board 6 inches wide to enable the fowl to have easy access to the nests.

Dry mash hoppers are located on stands two feet from the floor. Ten feet of feeding space is recommended for each 100 hens. Another platform 2 feet from the floor will provide for the water trough. This trough, made of galvanized iron, is 3 feet long, 8 inches wide, and 6 inches deep. This will accommodate 200 birds.

Where milk is available, a stand for a wooden pail should be provided. Small hoppers located on the wall provide for grit and oyster shell.

The farm poultry equipment is not complete without a portable colony brooder house. The minimum size recommended is 12 feet square. It need not be expensively built, but must have a double floor and the walls made draught-proof. As in the poultry house, the windows are located on the south side. To avoid loss from crowding, the corners are rounded.

A coal burning brooder stove is located in the centre of the building, and such a stove should be of a large size, commonly rated as 1,000 chick size, in order to insure a fire burning for at least 12 hours without replenishing. The brooder stove is safest located on a layer of bricks on their flat as a safeguard against fire.

The brooder house should be equipped with 5 feet of hopper space and one porcelain drinking fountain for each 100 chicks. The eavestrough feeder has proven to serve as an excellent hopper.

Soil Contamination

Sanitation at all times, and more particularly until the birds are mature, is of paramount importance. Intestinal parasites such as various kinds of worms and coccidiosis, breed rapidly in the soil. To safeguard against this, the brooder house may be moved to a new location at least once each year, and preferably two or three times during the growing season on to new, clean land. Under no circumstances should chicks be raised on land where poultry, old or young, has run for two years.

A constant and abundant supply of succulent greens during the growing period will build up health, vigor, and disease resistance in the mature birds. The green pasture suggested could be an annual seeding of oats, barley, fall rye, or rape, or permanent pasture such as alfalfa.

Care and Management of Chicks

Under no circumstances attempt to raise chicks of different ages together. A fire should be started in the brooder stove two or three days before the chicks arrive, and the thermostats regulated to maintain a floor temperature of 90 degrees. The temperature will be reduced 5 degrees a week until the stove is no longer required.

For the first few days the chicks are kept up to within 3 feet of the edge of the canopy by means of a wire guard. The drinking fountains should be filled with warm water. The feed will consist of any recognized standard baby chick mash fed in the lids of the chick boxes for the first three days, after which hoppers will be used. A recommended chick mash mixture is as follows:

Groung Wheat	100 lbs.
" Oats (hulls sifted out)	100 "
" Barley (very fine)	50 "
" Corn	75 "
Alfalfa Leaf Meal	35 "
Fish Meal	50 "
Beef Scrap	50 "
Milk Powder	25 "
Salt	5 "
Cod Liver Oil	10 pints.

This mash will be continued for four weeks. At the end of two weeks, however, the birds should be given some scratch grain twice a day. By the time the chicks are four weeks old they can be changed gradually over a period of ten days to a developing mash made as fol follows:

Ground Wheat	200 lbs.
" Oats (Finely ground)	200 "
" Barley (Finely ground)	200 "
Beef Scrap	35 "
Bone Meal	25 "
Salt	6 "

At the same time, all the whole wheat that the birds will eat is fed twice a day.

In the event of cannibalism, pine tar applied to the bleeding parts will save the chick, and often stop the habit. Lowering the temperature in the brooder house and getting the birds outside will help effect a cure.

Cockerels

When the brooder stove is no longer required, and the sexes can be easily distinguished, the cockerels should be removed and put on a fattening ration and sold as broilers or moved out on the range and raised to maturity away from the pullets. If the cockerels are to be sold as broilers, more rapid gains will be made if they are confined to limited range and fed a wet mash three times a day. Cockerels grown to maturity will be more porfitable if fattened for three weeks before being marketed. The feed during this period may consist of equal parts of wheat, oats, and barley, moistened with milk.

Pullets

A close watch should be kept on the pullets during the late summer months to make sure that they are not outgrowing their premises. Foul air causes colds and roup to develop, which may set the flock back for several months. When the pullets are 4½ to 5 months old, they should be treated for body parasites and moved into the laying house which has previously been made ready by a thorough cleaning, disinfecting, whitewashing.

Colds may develop at this stage, too, particularly in the case of pullets moved from out-door sleeping quarters. To avoid this, all windows are removed to provide ample fresh air,

As the pullets commence to lay, they can be gradually worked on to a lyinng mash consisting of protein mineral supplement added to farm grains in the proportion as recommended with the particular supplement which you choose to buy. Immediately the birds are placed in winter quarters green feed is important, and may be supplied from garden refuse, lawn clippings, or alfalfa. During the entire winter, an abundance of green feed is a decided advantage in maintaining health. The body weight of the pullets should gradually increase as the months pass. To lose weight will almost certainly result in an unseasonable moult, and a pause in egg production.

During cold weather, the feeding of boiled wheat once a day may help to maintain body weight. Cod Liver Oil may be required in addition to that contained in the protein mineral supplement and may be added at the rate of 1% of the total mash mixture.

With healthy stock raised as outlined above, the mortality will not likely exceed 3 or 4% during the winter months, and where deaths occur frequently, the District Agriculturist or local poultry fieldman should be consulted. Sometimes it is desirable to send live but ailing specimens to a pathological laboratory for examination.

In the event of the birds appearing to be out of condition, it is a wise precaution to feed Epsom Salts once or twice a month at the rate of 1 lb. per 100 birds.

The litter should be kept clean and dry. If necessary, set up the brooder stove in the laying house to speed up the ventilation and help keep the building dry and warm.

Eggs should be collected three or four times a day and kept in a cool place. Dirty eggs may be rubbed clean with steel wool. It will help greatly to keep the eggs clean if fresh material is put in the nest boxes regularly, and the dropping boards are cleaned first thing in the morning. Poultry wire stretched on the underside of the perches, and a hinged board extending from the perches to the dropping board will keep the birds out of the dirt, resulting in cleaner eggs. Candle and grade each day's eggs as they are collected, and pack them in egg crates ready for shipment.

Those interested in selling hatching eggs are required to apply for flock approval and blood test service in September. When hatching eggs are being collected, they are best kept at a temperature of between 45 and 50 degrees and turned daily. In transporting hatching eggs from the farm to the hatchery, the crates of eggs may be wrapped in paper to avoid chilling. Between the farm and the express office, the additional protection of a blanket will help to safeguard fertility

Poultry Organizations

Several poultry organizations are maintained in Alberta, and farmers should endeavour to organize Accredited Flock groups in their vicinity in order to take advantage of the possibilities of collective buying and selling, and to obtain the more frequent services of a poultry inspector.

Trapnesting under Dominion R.O.P. is recommended for those interested in breeding. The sale of R.O.P. cockerels and other R.O.P. breeding stock is an attractive part of the poultry industry.

Whenever breeding stock is required, contact may be made with the Alberta Poultry Federation where a complete and up to date list of all kinds of breeding stock is available.

Turkeys

Turkey raising is carried on extensively in Alberta, the Bronze variety greatly predominating in numbers over all other breeds combined. The important thing in selecting turkeys is to obtain an early maturing, meat type bird. The Alberta Bronze Turkey Breeders' Association is in a position to supply such stock at all times.

Turkeys require little housing, but an open shed of some sort is desirable so that they will have a specific place which they will consider their home. They should not be allowed to mix with other poultry, and under no circumstances be kept in the laying house. The young turkeys should be raised on land that has been free from poultry of any kind for two or three years, and away from the chickens. Alfalfa pasture makes ideal range.

The above sketchy outline of poultry raising in Alberta may be supplemented through the numerous bulletins dealing in detail with all branches of poultry raising which are available at the Poultry Branch, Department of Agriculture, both Dominion and Provincial, and the University. Anyone undertaking to raise poultry should not be without these bulletins.

ALBERTA CEREAL VARIETIES ZONATION MAP

1937

Prepared by:
VARIETAL ZONATION COMMITTEE
Issued by the
DEPARTMENT OF AGRICULTURE
PROVINCE OF ALBERTA

NOTIKEWIN
PEACE RIVER
FAIRVIEW
SPIRIT RIVER
MCLENNAN
HYTHE
HIGH PRAIRIE
GRANDE PRAIRIE
TOWNSHIP 95
WESTLOCK
OPAL
SMOKY LAKE
BELLIS
VILNA
ST. PAUL
MANOLA
ALCOMDALE
CALAHOO
STONY PLAIN
THORSBY
ZONE 4
ZONE 3B
ZONE 3A
ZONE 2
ZONE 1
WILLINGDON
MYRNAM
MARWAYNE
VERMILION
TP. 54
EDMONTON
LEDUC
MINBURN
BRUCE
TP. 45
WETASKIWIN
HEISLER
LACOMBE
BENTLEY
BOTHA
CORONATION
TP. 35
RED DEER
LOUSANA
VETERAN
CONSORT
OLDS
HANNA
CARSTAIRS
TREFOIL
COCHRANE
CALGARY
BASSANO
HIGH RIVER
LOMOND
TURIN
CHIN
MACLEOD
LETHBRIDGE
STIRLING
PINCHER
WARNER
COUTTS

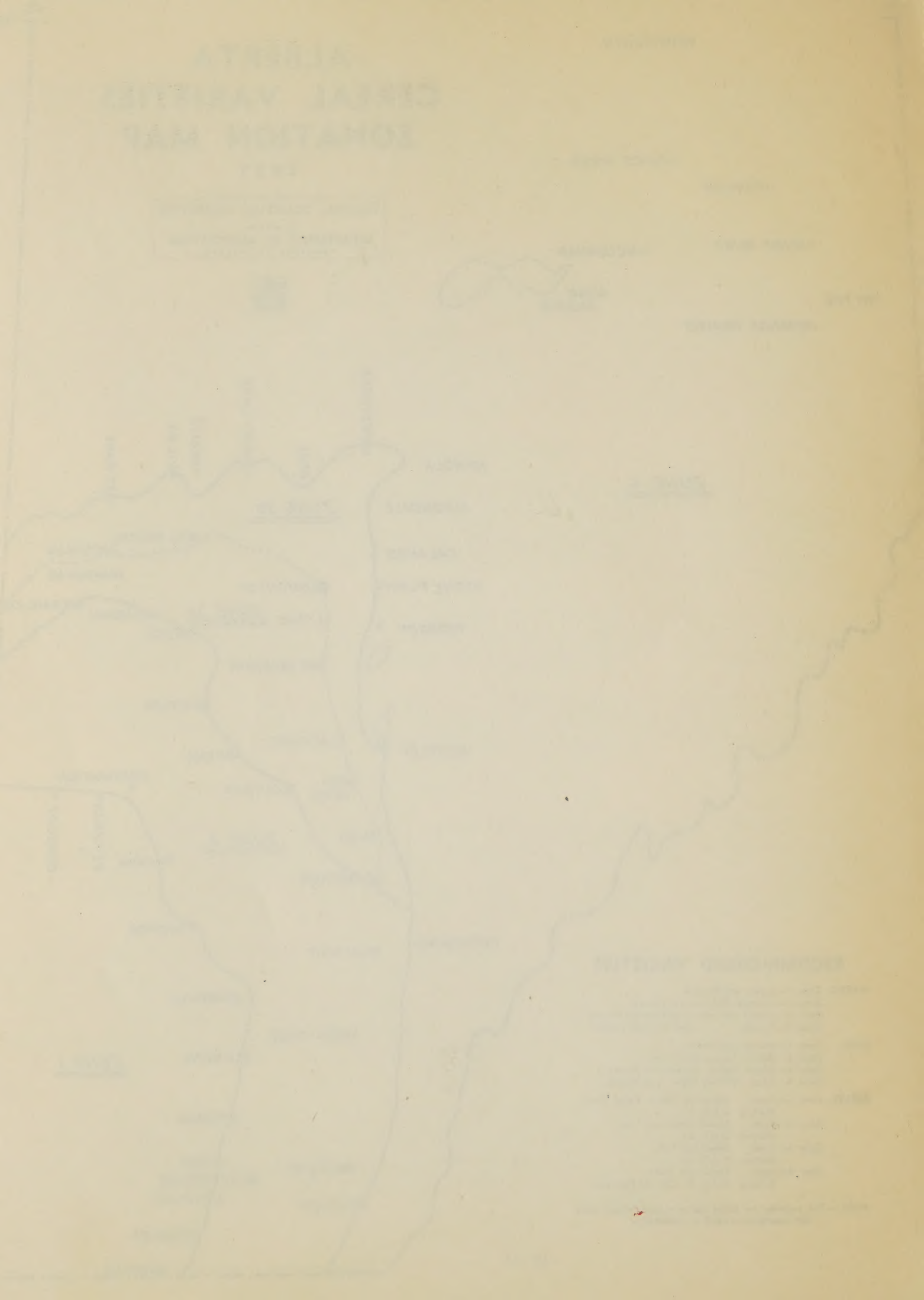
RECOMMENDED VARIETIES

WHEAT: Zone 1—Canus and Marquis.
Zone 2—Marquis, Red Bobs and Reward.
Zone 3—Garnet (3b only), Red Bobs and Reward.
Zone 4—Garnet, Red Bobs and Reward.

OATS: Zone 1—Banner and Victory.
Zone 2—Banner, Legacy and Victory.
Zone 3—Alsask, Banner, Legacy and Victory.
Zone 4—Alsask, Banner, Legacy and Victory

BARLEY: Zone 1—Feed: Hannchen, Newel, Regal, Trebi.
Malting: O.A.C. 21.
Zone 2—Feed: Newal, Regal and Trebi.
Malting: O.A.C. 21.
Zone 3—Feed: Newal and Trebi.
Malting: O.A.C. 21.
Zone 4—Feed: Newal and Trebi
Malting: O.A.C. 21, Olli and Peatland.

NOTE:—The varieties are listed above in alphabetical order, not according to merit or desirability.



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